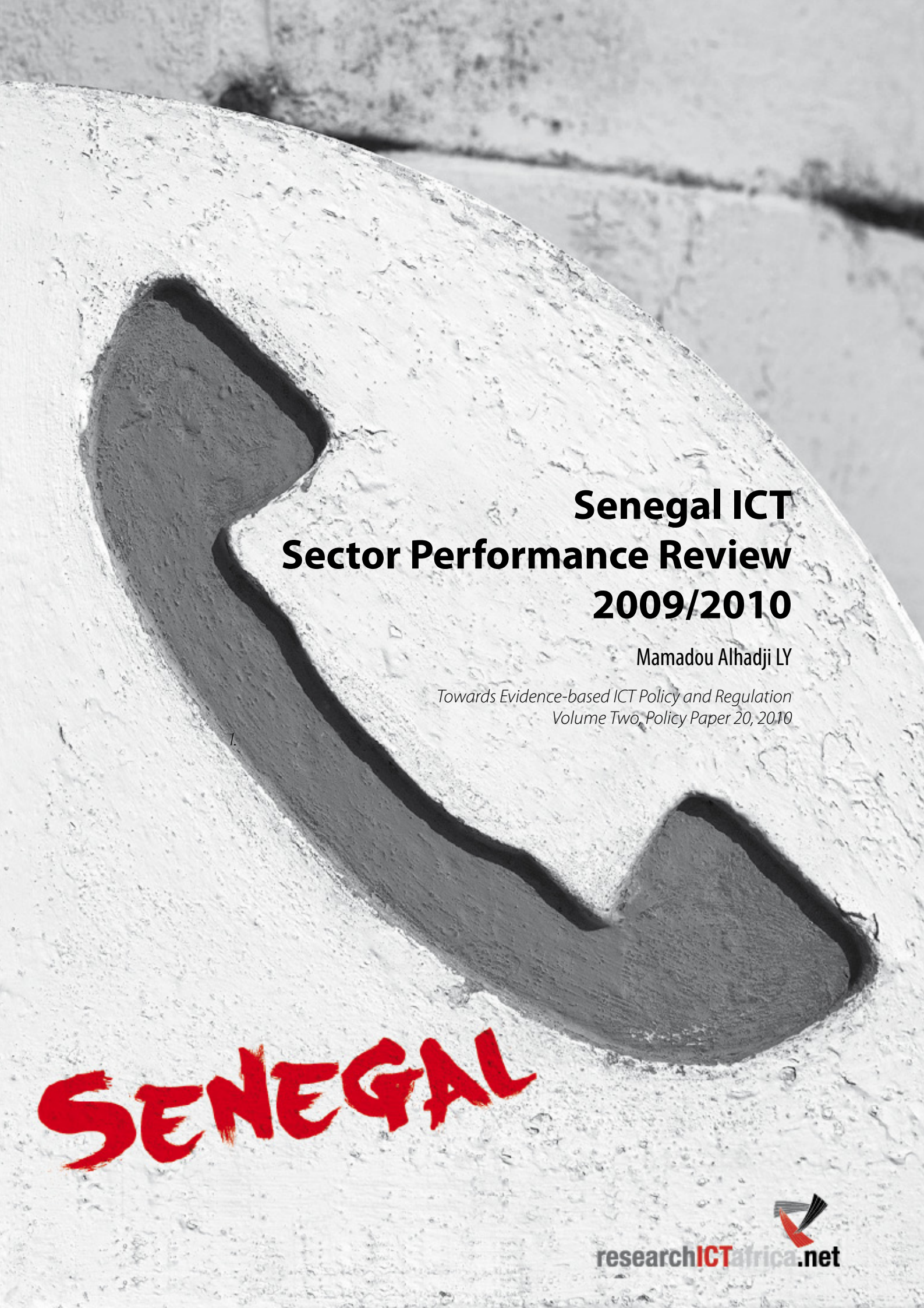

Senegal ICT Sector Performance Review 2009/2010

Mamadou Alhadji LY

Towards Evidence-based ICT Policy and Regulation
Volume Two, Policy Paper 20, 2010

researchICTafrica.net

Research ICT Africa

Research ICT Africa is a non-profit public research network which is concerned with information and communication technology (ICT) development policy and governance. It is based in Cape Town, South Africa and is under the direction of Dr. Alison Gillwald. It aims to bridge the strategic gap in the development of a sustainable information society and a knowledge-based economy by conducting research on the policies and governance of the necessary ICT to document efficient governance in Africa. Initially financed by the CRDI, the network tries to extend its activities through national, regional and continental partnerships. The creation of the Research ICT Africa network meets the growing need for data and analysis necessary for an appropriate but visionary policy in order to propel the continent into the information age. Through the development of a network, RIA seeks to build an African knowledge base capable of supporting the ICT policy and regulation processes, and to ensure that the development of these processes is monitored on the continent. The research, coming from a public interest agenda, in the public domain and individuals, public and private sector entities and civil society are also encouraged to use it for training, future research or to make the most of it in order to enable them to participate more efficiently in the formulation of ICT policy and governance on national, regional and global levels. This research is made possible thanks to significant funds received from the International Development and Research Centre (CRDI), Ottawa, Canada, to whom the members of the network express their gratitude for its support. The network is formed by 18 African countries. Similar national studies are available for South Africa (Kammy Naidoo/Steve Esselaar), Benin (Dr. Augustin Chabossou), Botswana (Dr. Patrica Makepe), Burkina Faso (Dr. Pam Zahonogo), Cameroon (Prof. Olivier Nana Nzèpa), Côte d'Ivoire (Prof. Arsene Kouadio), Ethiopia (Dr. Lishan Adam), Ghana (Dr. Godfred Frempong), Kenya (Dr. Tim Waema), Mozambique (Francisco Mabila), Namibia (Dr. Christoph Stork), Nigeria (Prof. Ike Mowete), Rwanda (Albert Nsengiyumva), Senegal (Mamadou Alhadji Ly/Mar Cathy Dieng Sylla), Tanzania (Bitrina Diyamett), Tunisia (Prof. Farouk Kamoun) and Uganda (Dr. Nora Mulira).

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CONSORTIUM POUR LA RECHERCHE ECONOMIQUE ET SOCIALE (CRES)-SENEGAL

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Introduction

Senegal is a French-speaking country, with a surface area of 197,161 km^2, located on the Western edge of Africa; hence the name "Gateway to Africa". According to the 2003 census, its population is estimated at 12 million inhabitants, which corresponds to a density of 60.9 inhabitants/km^2. In 1994, the International Telecommunications Union ranked it ahead of other sub-Saharan countries in terms of penetration growth and service quality. Senegal has made significant investments in the ICT sector. The country has been connected to the Internet since April 1996, and services linked to New Information and Communication Technologies (NICT) are booming. The network is made up almost entirely of fibre optic cables.

The development of the sector remained favourable between 2008 and 2009, both from the point of view of performances recorded in the regulated sectors, and from the strategic options taken by the regulator in order to carry out its task.

The institutional environment of the telecommunications sector is marked by the presence of a public authority, which determines sector policy. This policy is based on a system of which the President of the Republic is at the centre. Under the aegis of the Special Advisor of the President of the Republic (who is in charge of new information and communication technologies), there are two essential state policy instruments in this area. They are the Agence de l'informatique de l'État (ADIE) and the Agence de régulation des télécommunications et des postes (ARTP), both associated with the Secretary General of the President of the Republic. Rounding out the structures directly in charge of the sector is the "NICT and Teleservices" cluster. It includes the Accelerated Growth Strategy (AGS) structure, which promotes and supports development. Sector policy comes under the Ministry of Posts, Telecommunications and NICT, which relies mainly on the research, planning and legislation directorate in terms of the management of ICT.

The development of the sector remained favourable between 2008 and 2009, both from the point of view of performances recorded in the regulated sectors, and from the strategic options taken by the regulator in order to carry out its task. With a turnover of 600 thousand million francs CFA, an investment volume of 120 francs CFA, growth in the total number of Internet subscribers at close to 50%, and a telephone penetration rate of 51%, the Senegalese telecommunications sector remains among the highest performing in Africa in 2009.

Furthermore, the arrival of a new operator has led to the modification of the decree on the national numbering plan, which has enabled the allocation of short numbers to value-added service providers, thus contributing to the advent of new role players in the ICT sector.

Despite the international financial crisis, the year 2009 was characterised by significant growth in the ICT sector in Senegal.

Despite the international financial crisis, the year 2009 was characterised by significant growth in the ICT sector in Senegal. On the whole, it is the only sector to have been spared by the international financial crisis on a global scale. The total number of fixed lines, mobile phones and Internet services increased at a steady pace. This remarkable progress was made possible by large investment efforts made by licence holding operators and, especially, by the growth and diversity of new service offerings.

The purpose of this document is to give a report on the situation of the telecommunications sector in Senegal. Section I analyses policy and regulatory activities, section II studies the structure and development of the market, and section III looks at universal service.

Policies and Regulation Activities

Regulation of Frequency Management

Spectrum Planning and Engineering

Engineering, planning, coordination of frequencies and notification are the key activities in frequency management. The year 2008 was marked, operationally, by the use of the Système Informatique Intégré de Gestion Automatisée des Fréquences (SIGAF) in the activities of frequency management.

A document entitled "Plans Nationaux de Fréquences" (National Frequency Plans) was drawn up and published by the ARTP in the spectrum-engineering framework. This document informs equipment users and providers of the channel arrangements that are in force in Senegal. It integrates an important aspect of international frequency regulation, that is to say, the harmonisation of frequencies and channel arrangement.

In terms of planning, the national board of frequency allocation (one of the fundamental tools in frequency planning) has been revised in order to take the changes that have taken place in radiocommunication regulation into consideration.

In addition to this document, a study was carried out on wireless broadband technologies and their possible uses for Senegal.

Frequencies have been assigned to users according to national channelling plans that are drawn up by the National Board of Frequency Allocation. The following table gives data about the evolution of allocations in 2008 compared to previous years according to the type of frequency band.

Table 1: Evolution of allocation in 2008 according to frequency bands

Specification	2005	2006	2007	2008
Allocations in MF band	8	0	0	0
Allocations in HF band	119	10	5	158
Allocations in VHF band	86	103	43	155
Allocations in UHF band	307	35	23	132
Allocations in SHF band	246	146	207	216
Total	**766**	**294**	**278**	**661**

Source : ARTP 2008

The year 2008 was marked by a considerable increase in the number of allocated frequencies: from 278 in 2007 to 611 in 2008. The entry of a third operator into the Senegalese market is one of the reasons for the rise in the number of frequency allocations compared to past years.

The year 2008 was marked by a considerable increase in the number of allocated frequencies: from 278 in 2007 to 611 in 2008.

In addition, the number of SHF band frequencies, essentially made up of the radio-relay system of licensed operators, increased compared to 2007.

This increase is due to new installations by EXPRESSO Senegal as art of its backbone network. It can also be noted that during the past three years there was an absence of frequency requests for radio-relay installations from SENTEL GSM, despite growth in its network.

The table below gives some data on the number of allocations made in 2008 according to the service (PMR, FM, TV, CDMA, GSM, UMTS):

Table 2: Number of allocations made in 2008 according to service

Name of service	Application	Number of frequencies allocated
Mobile	PMR	350
	GSM	11
	CDMA	8
	UMTS	1 under allocated band
Radio broadcasting	FM	13
	TV	4
Total	**FH**	**216 links**

Source ARTP 2008

Frequency allocations are split mainly between five applications which use frequency resources: private networks (PMR), sound radio broadcasting with frequency modulation (FM), television broadcasting (TV), radio-relay systems (FH) and fixed access wireless technologies (CDMA and WCDMA).

Network Management Regulation

The operational activities of network management over 2008 can be summarised as the processing of applications relating to authorisation, cancellation, modification and exemption, without forgetting information or inquiries.

This is how various authorisation decisions have been issued, network modifications have been authorised, cancellations made and exemptions awarded.

Authorisation Decisions

PMR

The table below recapitulates the number of decisions issued during 2008, giving authorisation to set up and use an independent private radioelectic network.

Table 3: Authorisation to set up and use an independent private electric network

No.	Name	Decision number	Date	Type of network
1	TOTAL GAZ	10171	28/01/2008	MF/HF& U/VHF
2	FFCV	10168	28/02/2008	MF/HF& U/VHF
3	FFCV	1016'	15/10/2008	VHF
4	RTS	10170	29/02/2008	UHF
5	DP WORLD	10167	31/03/2008	VHF
6	SAMU	10166	07/05/2008	VHF
7	SENCA	10050	13/05/2008	VHF
8	SOFRASEP	10165	30/07/2008	UHF
9	FFCV	10164	15/10/2008	BA VHF
10	GOLDEN LION ENTREPRISES	10162	10/11/2008	VHF
11	CSL	10161	17/11/2008	VHF
12	KEPAR SURL	10159	26/11/2008	UHF
13	WARTSILA WEST AFRICA	10160	28/11/2008	VHF
14	ALLO TAXI	10156	16/12/2008	UHF
15	ORYX SENEGAL	10154	18/12/2008	BM VHF

Source : ARTP 2008

VSAT (Very Small Aperture Terminal)

VSAT includes all telecommunication services via satellite using a narrow part of the total satellite capacity, thanks to a small transmission-reception terminal allowing information exchange at low or medium speed.

Eight (08) licenses giving authorisation to telecommunication stations via satellite/VSAT were issued in 2008.

Table 4: Authorisation of telecommunication stations via satellite

No.	Name	Decision number	Date
1	LA POSTE	020039	11/03/2008
2	OMS	020041	16/05/2008
3	CBTO	020042	02/06/2008
4	HCR	020037	28/02/2008
5	FFCV	020038	28/03/2008
6	COMMISSION EUROPEENNE	020040	26/03/2008
7	ERICSON SENEGAL	020044	26/08/2008
8	EXPRESSO SENEGAL	020045	18/11/2008

RADIO BROADCASTING

Table 5: FM Radio broadcasting

No.	Name	Decision number	Date	Type of radio
1	AIDA FM	50068/AUT	26/02/2008	Community
2	XEW-XEW FM	50088/AUT	27/02/2008	Commercial
3	RADIO CONVERGENCE	50090/AUT	26/03/2008	Commercial
4	RADIO DU WALO	50091/AUT	23/04/2008	Community
5	NORD FM	50092/AUT	05/05/2008	Community
6	TIVAOUNE FM	50094/AUT	03/06/2008	Community
7	DIANT BI FM	50093/AUT	04/06/2008	Community
8	SUNU FM	50085/AUT	14/09/2008	Community
9	GABOU FM	50095/AUT	10/11/2008	Community
10	MEDINA WANDIFA FM	50095/AUT	10/11/2008	Community
11	SOFA NIAMA FM	50095/AUT	10/11/2008	Community
12	KALONAYES FM	50095/AUT	10/11/2008	Community
13	KARABANE FM	50095/AUT	10/11/2008	Community

Table 6: TV broadcasting

No.	Name	Decision number	Date
1	RTS	50086/AUT	05/02/2008
2	CANAL INFO	50087/AUT	07/02/2008
3	TELE FUTURS MEDIAS	50089/AUT	11/03/2008
4	2 STV	50094/AUT	03/10/2008

BLR

Only one license relating to the set-up of a BLR network was issued in 2008.

No.	Name	Decision number	Date
1	ORXY SENEGAL	10163	30/10/08

GSM

In 2008, a new licence for GSM channel allocation was issued to the new operator, Expresso Sénégal.

No.	Name	Decision number	Date
1	EXPRESSO SENEGAL	00005/LIC/ML	01/04/2008

FH/ROP

No.	Name	Decision number	Date
1	EXPRESSO SENEGAL	00003/LC /FX	25/02/2008
2	SONATEL	DECISION ARTP	24/11/2008

FH/RPI

No.	Name	Decision number	Date
1	FFCV	10169	28/02/2008

ACCESS NETWORKS

No.	Name	Decision number	Date
1	EXPRESSO SENEGAL	00003/LIC/ML	CDMA
2	EXPRESSO SENEGAL	00004/LIC/ML	UMTS/3G

Note: *In 2008, no licenses were issued concerning the 2RC& 3RP, SMS and MMDS network types.*

Network Modifications

Over the course of the year, network modification requests were entered and processed. They essentially affect the PMR network operating licence holders: BCEAO/Agence, DIPROM Touba Gaz, and EIFFAGE SENEGAL (ex FOUGEROLLE).

These modifications consisted of additions, retractions or changes, either to radio stations or to frequencies.

There was also a modification in the Walfadjiri Group's authorisation decision relating to the use of FM radio broadcasting stations.

In fact, the Walfadjiri Group returned 15 of the 27 allocated frequencies as a result of the modification to its network.

Cancellations

Cancellations were made in 2008 and mostly concerned PMR networks. The table below recapitulates the licences that were withdrawn during this year:

Table 7: Cancellations

No.	Name	Decision no.	Date of cancellation	Type of network
1	CSE	10108	10/03/2008	PMR
2	JICA	10239	26/03/2008	PMR
3	HOTEL SAVANA	10185	28/03/2008	PMR
4	SENOUSIAP	10263	28/03/2008	PMR
5	SENOUSIAP	10262	28/03/2008	PMR
6	ATLANTIC EVASION	10064	17/04/2008	PMR
7	DAKAR CARTERING	10050	13/05/2008	PMR
8	IRD	20010	06/06/2008	VSAT
9	FRAMOTEL	10047	10/07/2008	PMR
10	GRANDS DOMAINES DU SENEGAL	10080	09/01/2009	PMR

Update and Reliability of Licensee Files

In 2008, the licensee's database was updated and made more reliable. Thus, on 31 December 2008, the operational networks' situation was as follows:

PMR

The number of PMR networks in use has risen to 214. Various frequencies have been allocated for their operation, as can be seen in the summary table below:

Type of frequency	BA VHF	BM HF	BM VHF	HF	VHF	UHF
Number of frequencies	8	55	55	46	217	69

Source ARTP 2008

This data does not take security networks such as the ASECNA, Police, Gendarmerie, Forces Françaises du Cap Vert etc. into account.

With the exception of these six, all these networks have been updated and have been licensed by the ARTP.

FM RADIOS

Ninety-three FM radio stations are licensed to broadcast. They consist of commercial, community and foreign radio stations. In total, 270 frequencies have been allocated.

Type of radio	Community	Commercial	Foreign
Number	60	27	03
Number of frequencies	70	192	08

Other networks

Type of radio	Number of networks or users
TV	Four (04) licensees holding TV broadcasting operating licenses for a total of forty-seven (47) allocated frequencies
VSAT/RPI	Thirty-eight (38) independent private VSAT networks are currently licensed
BLR	Thirteen (13) BLR operational networks are registered on the database
FH/RPI	Eight (08) licensees holding licenses to set up and operate independent private networks via radio-relay links
FH/RPO	The three (03) telephone operators hold operating licences for networks open to the public via radio-relay links
GSM	The three GSM network operators share 123 channels in the 900 MHZ band and 110 channels in the 1800 MHZ band
CDMA/UMTS ACCESS NETWORK	The ARTP issued two CDMA network operating licences to the ADIE and EXPRESSO and one UMTS licence to EXPRESSO

Interconnection

As a reminder, in 2007, by decision no. 022007/ARTP/DG/DJ/DT of 1 June 2007 concerning the determination of market segments and setting up the list of operators who held a dominant position in the telecommunications market for the year 2007, the ARTP determined the telecommunication market segments in Senegal (following table):

Table 8: Telecommunication market segments in Senegal

	Name of market segment analysed	Market share indicator in volume	SONATEL	SENTEL
A	Termination of incoming minutes	Volume of incoming minutes	yes	no
B	Total traffic on the fixed network	Volume of transporter selection minutes	yes	no
C	National transit	Volume of minutes of transfer to other Senegalese networks	yes	no
D	International transit	Volume of international transit minutes	yes	no
E	Termination of traffic on the mobile network	Volume of incoming minutes	yes	no
F	Data transmission	Amount of wholesale DSL access	yes	no
G	Capacity leasing	CA linked to supply of wholesale specialised links	yes	no
H	IP Transit	Volume of IP transit Mbits	yes	no
I	Signal service necessary for international roaming	Traffic linked to signal service necessary for international roaming	yes	no
J	Access to special services	Volume of minutes to special numbers	yes	no

Source : ARTP 2008

In the framework of the approval process of interconnection catalogues 2008, the regulation agency (ARTP) has, by decision no. 02027/ARTP/DG/SG/DO of 15 May 2008 setting the list of operators holding a dominant position in the telecommunications market for the year 2008, named the operators holding a dominant position in each market segment. They are:

In the framework of the approval process of interconnection catalogues 2008, the regulation agency (ARTP) has, by decision no. 02027/ARTP/DG/SG/DO of 15 May 2008, set the list of operators holding a dominant position in the telecommunications market.

SONATEL : considered to be an operator holding a dominant position in all the market segments listed in the first article of the above-mentioned decision.

SENTEL GSM : considered to be an operator holding a dominant position in the market segment relating to traffic termination on the mobile network.

It has to be noted in this connection that to determine the dominant position in the "traffic termination on mobile networks" market, the ARTP considered not only market share but also criteria of access to financial resources and experience in providing telecommunication services (article 2 of the Telecommunications code). An operator's dominant influence is assumed when an operator holds a market share higher than 25% in the telecoms market, but this criterion is neither necessary nor sufficient. An operator holding a market share of higher than 25% could not be said to hold a dominant position if other criteria take priority. Similarly, an operator could be considered to be holding a dominant position without necessarily holding more than 25% of the market.

With reference to this decision, the two operators (SONATEL and SENTEL) have submitted an interconnection catalogue project for approval. This catalogue project was approved by the ARTP for:

- SONATEL, by decision no. 10062/ARTP/DG/SG/DO of 30 October 2008 giving approval to SONATEL's interconnection catalogue for the period 1 July 2008 to 30 June 2009;
- SENTEL Gsm, by decision no. 10063/ARTP/DG/DO of 30 October 2008 giving approval to SENTEL GSM's interconnection for the period 1 July 2008 to 30 June 2009.

The ARTP has, in addition, implemented a system of monitoring operators and rates and of identifying subscribers.

Structure and Analysis of the Telecommunications Market

At the end of 2008, the telecommunications sector in Senegal was structured as follows:

- Two global operators:
  - SONATEL with a total of more than 237,000 fixed lines and a total of 3,536,672 mobile subscribers used by its subsidiary SONATEL Mobiles;
  - EXPRESSO, a new global licence holder whose activities started up in 2009;
- A mobile telephone operator, TIGO (SENTEL), a subsidiary of Millicom International Cellular, with a total number of 1,852,461 subscribers;
- Four ADSL internet access providers;
- Value added service providers (answering services, kiosk services, SMS+call centre, etc.);
- Pre-paid card providers;
- More than 12,000 tele-centres and 3,000 other types of resellers (shops, petrol stations, etc.) of which 200 to 400 are internet cafés.

Today, there are three mobile operators (Orange, Tigo and Expresso) and the market seems ready to accommodate others, such as mobile telephone service providers.

Telecommunications Market Analysis

The telecommunications market performance is characterised by competition in mobile service provision. Today there are three mobile operators (Orange, Tigo and Expresso), and the market seems ready to accommodate others.

Conversely, the number of operators for fixed lines and the Internet is reduced for the moment to two operators: the incumbent operator Sonatel (Orange) and a new operator holding a global licence, SUDATEL (Expresso).

Thus, despite the presence of three big telecommunication operators in Senegal, universal access still remains a major problem.

Despite the presence of three big telecommunication operators in Senegal, universal access still remains a major problem.

Table 9: The main role players in the ICT sector

Service	Operators
Fixed	Sonatel – Orange
	Expresso [1]
Mobile	Sonatel – Orange
	Sentel - Tigo
	Sudatel - Expresso
Internet	Sonatel – Orange
	Sudatel - Expresso

The Telephone Market

This sub-sector is made up of fixed-line telephones and mobile telephones. Fixed lines consist of telecentres, private connections (residential lines) and commercial operation (business lines). Telecentres play a very important role in fixed-line telephones, notably through the creation of wealth and employment. They allow a large number of people to access telephone services, especially in rural areas where the lack of telecommunication infrastructure is marked.

[1] Expresso's fixed line product has just been launched in August 2009.

At the same time, the mobile telephone market seems to be replacing fixed telephones and contributes very significantly to telephone accessibility in Senegal. In this segment, the competitive situation has promoted the development of the market. This is how, over the past few years, mobiles have occupied a central place in the progress of the ICT sector, and more precisely in the global penetration of telecommunication services.

The mobile telephone market seems to replace fixed telephones and contributes very significantly to telephone accessibility in Senegal.

The development of networks has led to a marked growth in the number of users. As of 31 March 2007, a total number of 285,774 fixed-line subscribers and 3,378,272 mobile phone subscribers was recorded.

Fixed-Line Telephones

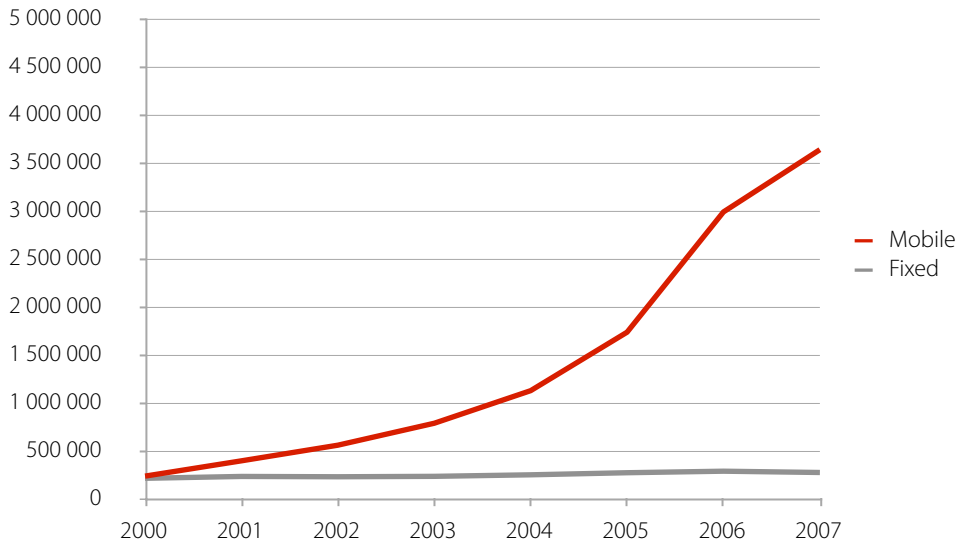
The total number of fixed lines could not withstand the growth of mobile telephones. Confronted with the dazzling rise of mobile telephones, it has regressed significantly over the past few years. The year 2008 marked the end of the growth in the total number of fixed lines, with 237,752 lines on 31 December compared to 269,088 the previous year (a decrease of 11,6%). Consequently, the problem of nationwide coverage by the fixed-line network arises since the penetration rate is progressively diminishing (from 2.5% at the end of 2007 to 2.3% in 2008). This situation can be explained by the large reduction in the number of telecentre lines (close to 35%). Nearly 10,000 tele-centre lines were cancelled in 2008, taking the total number of telecentre lines from 15,000 lines in 2007 to 5,500 in December 2008. This tendency is also due to the cancellation of 5% of residential lines – mainly the prepaid lines "Keurgui Kheweul" and "Keurgui confort", which have decreased by 7,64% and 28,08% respectively (ADTP 2008).

Table 10: Number of fixed-line and mobile subscribers 2000–2008

Service	2000	2001	2002	2003	2004	2005	2006	2007	2008
Fixed	208 582	228 000	224 623	229 000	244 948	266 612	282 573	269 088	237 752
Mobile	231 375	390 636	553 440	782 000	1 121 314	1 730 106	2 982 623	3 630 804	5 389 133

Graph 1: Evolution of fixed and mobile telephones

Source: ARTP data put together by the authors.



Mobile Telephones

Mobile telephones include all services accessed from a mobile terminal (mobile to mobile on the same network or a third-party mobile, mobile to fixed line, mobile to advanced service) as well as paging services. The total number of mobile users comprises "prepaid" and "postpaid" customers. Close to 99% of the total number is made up of prepaid chips.

With a 48.4% growth by the end of 2008, the total number of mobile subscribers increased to 5,389,133 subscribers, compared to 3,830,604 the year before, indicating the market's dynamism. The penetration rate has, thus, increased from 34.3% to 50.9% over the course of the considered period (ARTP 2008).

With 48.4% growth at the end of 2008, the total number of mobile subscribers increased to 5,389,133 subscribers compared to 3,830,604 the year before, displaying once again market dynamism. The penetration rate has increased from 34.3% to 50.9% over the course of the considered period (ARTP 2008).

The dynamism of the mobile telephone segment has largely benefitted the two competing operators. They have expanded their respective total numbers by means of commercial promotion throughout 2008. Thus, with growth rates of 41% and 65% respectively, Sonatel and TIGO increased their total number of subscribers to 3,536,672 and 1,852,461 by 31 December 2008.

In total, the distribution of market share between the two operators is 66% for Sonatel and 34% for TIGO (ARTP 2008).

The Internet Market

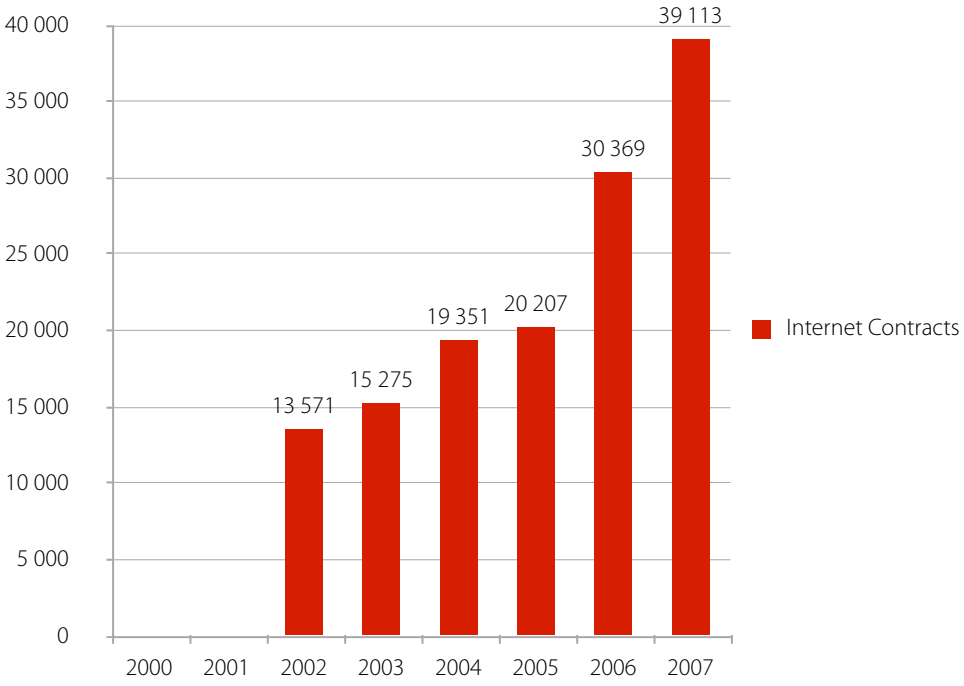
Senegal is linked to the global network by a bandwidth of 2.9 Gbps (underwater fibre optic cable and via satellite). Internet access is mainly enabled via the RTC network or via ADSL. The Internet network is one of the largest in sub-Saharan Africa, with four active ADSL providers. Since its introduction in March 2003, ADSL has been the preferred connection mode. The wireless local loop (WLL) is an alternative solution used by certain companies to implement independent private networks.

The number of Internet subscribers continues to grow, both for individual subscribers and companies. This progress was accelerated by the increase in international Internet bandwidth, which went up from 1.24 Mbps at the end of 2007 to 2.9 Gbps in 2008 (ARTP 2008).

The number of Internet subscribers continues to grow, both for individual subscribers and companies. This progress was accelerated by the increase in international Internet bandwidth, which went up from 1.24 Mbps at the end of 2007 to 2.9 Gbps in 2008 (ARTP 2008).

Nevertheless, the pace at which Internet penetration increases is slower than that of other types of ICT. The number of subscribers increased by 29%, from 39,113 at the end of 2007 to 48,110 in 2008.

Graph 2: Evolution of the total number of Internet subscribers (2002–2007)



Source ARTP

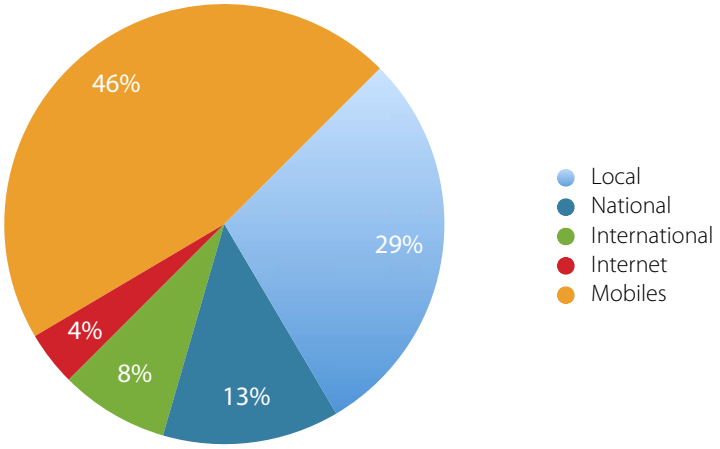
Billing

Fixed-Line Telephone Traffic

In 2008, traffic from the fixed-line network reached 566 million minutes, a drop of nearly 29% compared to the previous year. This decline has, in fact, been observed for many years and is in part due to the fact that fixed-line phones are being replaced by mobiles.

From this traffic, 46% of the traffic is directed towards mobile phones, 29% corresponds to local traffic, 13% to national fixed traffic, 8% to international fixed traffic and the remaining 4% to Internet traffic on the RTPC network.

Figure 3: Allocation of traffic volume coming from fixed-line communication in 2008



Source ARTP

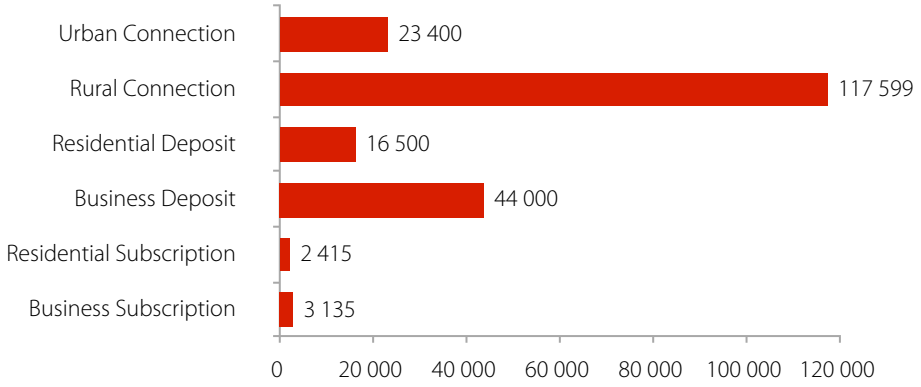
Fixed-Line Telephone Rates

Fixed-line communication rates have not changed since 2006.

In fact, fixed-line installation fees are still set at 39,510 F CFA including taxes for a business line. Professionals have the option of choosing a residential subscription.

Fixed-line communication rates have not changed since 2006.

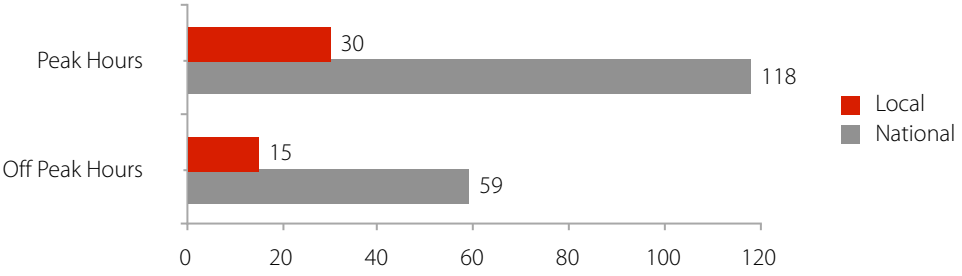
Figure 4: Access fees for fixed-line telephones



Source ARTP

As for communication, the rates including taxes for a local call are 59 F CFA for 4 minutes during off-peak hours. For national (or interurban) calls, the rates including taxes are 50 F CFA for 30 seconds during peak hours and 59 F CFA for 60 seconds in off-peak hours.

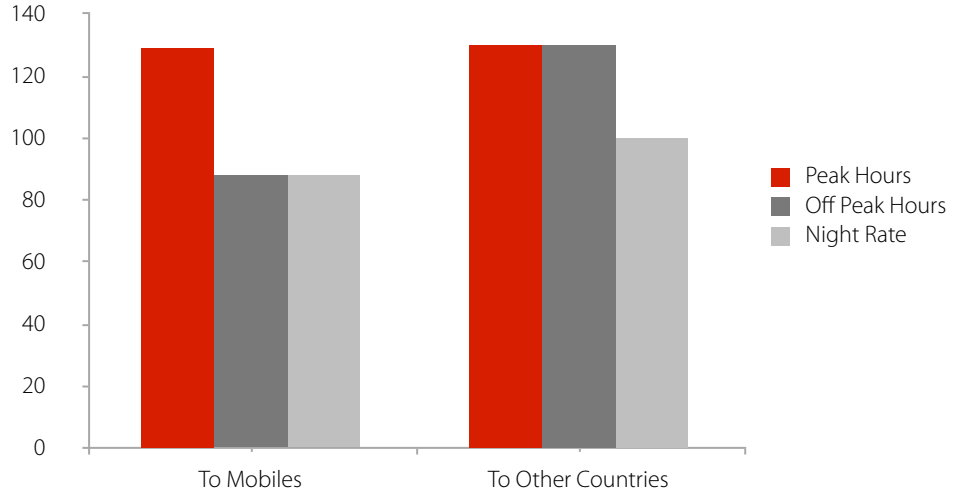
Figure 5: Rates in FCFA per minute for local communications



Source ARTP

Communication rates from a fixed line to a mobile phone are less expensive during off-peak hours and at night. International rates are cheaper at night.

Figure 6: Rates per minute to other destinations in 2008



Source ARTP

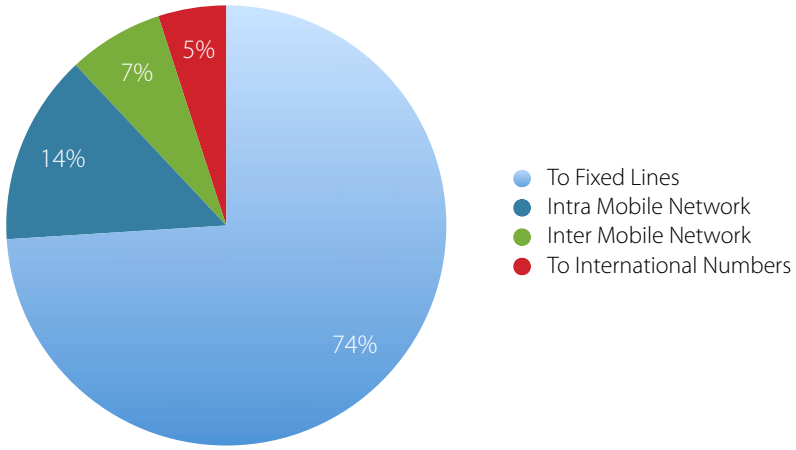
In addition, it should be emphasised that package offers exist, including:

- The "Keurgui Khéweul Line" offer with a monthly subscription of 5,900 F CFA including taxes (which also includes the monthly credit offered), operating with Orange recharge cards, and which offers communication unit costs of 75 F CFA including taxes;
- The "Keurgui Yakhanal Line" offer, operating with CDMA technology and dedicated to rural areas, with access fees of 15,000 F CFA;
- The "Fixed Rate Line" offer, which allows the subscriber, for a monthly fee of 18,000 F CFA, to make calls to a maximum of 18,000 F CFA in communication credit;
- The Pro prepaid offer, which is identical to the "Keurgui Khéweul Line" offer, but for residential customers. For a subscriber who already has a fixed line, the transfer cost is free, while a new subscriber must pay 10,000 F CFA including taxes to subscribe to this offer. The monthly charge is 6,900 F CFA;
- The "Keurgui Confort Line" offer, with a monthly charge of 10.,000 F CFA including taxes includes: three hours of local and national communication, two hours of communication to mobiles and one hour of international calls;
- The "Post Paid Confort Prestige Line" offer, which is the equivalent of the "Keurgui Confort Line" offer, but for professionals. The subscription conditions are the same as those of the Pro prepaid offer, except that the subscription fee for new clients is 52,000 F CFA including taxes. The monthly fee is 20,000 F CFA; and
- The "Post Paid Confort Excellence" offer, which is an offer designed for up-market business clients. The difference this and the "Post Paid Confort Prestige" offer is the monthly charge, which is 45,000 F CFA, as well as the associated communication credits. The offer allows access to eight hours of local and national communication, six hours of communication to mobiles and two hours of international communication.

Mobile Telephone Traffic

The growth in the total number of mobile telephones is accompanied by a strong development in traffic coming from the two mobile networks in operation during 2008. Thus, with a growth of 42% compared to 2007, the total traffic coming from mobile networks represented 3,437 million minutes in 2008 and can be split up as follows: 74% in the intramobile network, 14% exchange between the two mobile networks, 5% to fixed networks and 7% internationally.

Figure 7: Allocation of traffic volume coming from mobile communication in 2008



Source ARTP

Mobile Telephone Rates

The rates include both the purchase of a SIM and recharge cards, and the retailing of credit known as "SEDDO" for the operator Orange and "IZI" for the operator TIGO.

The mobile telephone operator offer is characterised by the predominance of the prepaid option and by its relative simplicity (no segmentation of clients apart from individuals/business).

The mobile telephone operator offer is characterised by the predominance of the prepaid option and by relative simplicity (no segmentation of clients apart from individuals/business).

- **Start-up costs:**

The current prices are as follows:

Sonatel Mobiles	Kit at 2,500 F CFA incl taxes	Consumer credit of 2,500 F CFA
Sentel (TIGO)	Kit at 2,000 F CFA incl taxes	Consumer credit of 1,000 F CFA

Sonatel Mobiles has a kit for 2500 F CFA inclusive with 2500 F CFA consumer credit and Sentel (TIGO) has a kit for 2000 F CFA inclusive with 1000 F CFA consumer credit.

- **Recharge cards:**

The two tables below recapitulate the recharge card offers placed on the market by the two operators:

ORANGE

Type of Recharge	Advantages	Validity After Recharge
1,000 F CFA Card	None	10 days
2,500 F CFA Card	Five Free SMS	15 days
5,000 F CFA Card	10 Free SMS	Two months
10,000 FCFA Card	10 free SMS + 2,000 F CFA credit	Two months
25,000 F CFA Card	10 free SMS + 5,000 F CFA credit	Three months

It should be noted that the 30,000 F CFA recharge card has been replaced by the 25,000 F CFA card. Additionally, since the crossover to the trade name Orange, these cards can also be used to recharge prepaid offers on fixed lines.

The sharing of credit at Orange Mobile has been named "Seddo", which in Wolof means "to share". This option enables Sonatel's prepaid subscribers to send themselves credit via SMS, for a minimum amount of 100 F CFA and a maximum of 5,000 F CFA. The cost of sending an SMS is 20 F CFA.

TIGO

Recharge Type	Advantages	Validity After Recharge
1,000 F CFA Card	None	10 days
2,000 F CFA Card	None	10 days
5,000 F CFA Card	None	Two months
10,000 FCFA Card	1,000 F CFA credit	Two months
50,000 F CFA Card	10,000 F CFA credit	Two months

TIGO also proposes the IZI offer, which allows it to reach the low-income population.

Table 11: Communication rates (in F CFA)

ORANGE TERANGA

Activation Costs			
Service access fees	21 000		
Charge	7 867		
ROAMING Access Fee			
Deposit (refundable)	200 000		
Call / Minute			
Destinations	**Peak Hours**	**Off-Peak Hours**	**Night Rate**
To SONATEL fixed	80		80
To ORANGE			50
Other GSM	80		
International	170		
SMS			
To ORANGE	20		
Other GSM	70		
International	95		

Source : ARTP

ORANGE PREPAID

Call / Minute			
Destinations	**Peak Hours**	**Off-peak hours**	**Night Rate**
To SONATEL fixed	90		90
To ORANGE			50
Other GSM	90		
International	170		
SMS			
To ORANGE	20		
Other GSM	75		
International	100		

TIGO UNLIMITED

Activation Costs	
Service access fees for all subscriptions	20 650
Monthly charge	7 910
ROAMING Access Fees	
Deposit (refundable)	150 000
Destinations	**Call / Second**
TIGO	1
Other networks	15
International	2,83
SMS	
National	20
International	1 003

Source : ARTP

This offer was launched this year and makes up Tigo's first post-paid offer.

TIGO PREPAID

Call / Second			
Destinations	**06H-17H59**	**18H-00H59**	**01H-05H59**
TIGO	1,5	1	0,5
Other national networks	1,7		
International	3		
SMS			
TIGO	20		
Other national networks	30		
International	100		

Tigo has reduced the division of its time slots from five to three.

The Expresso Prepaid offer will include:

- 1 SIM card
- 2 000 F CFA of initial credit
- A CDMA portable telephone

The Expresso Prepaid offer will be billed per second.

EXPRESSO: YOBALEMA Rate Plan

Expresso fixed line to other fixed lines (Orange and Expresso)	1F/Second
To all other mobiles	1.25F/Second
International calls	2.5F/second
National SMS	25F
International SMS	75F
1X*	3F/Min

Source : EXPRESSO 2010

Table 12: EXPRESSO: Recharges and Services

Type of Recharge	Values (in FCFA)
EXPRESSO recharge cards	500
	1000
	2000
	5000
	10 000
	25 000

Source : EXPRESSO 2010

Services

Type	Rate
Third party call	Free
Call forwarding	Free
Number display	Free
Temporary call forwarding	Free
Credit transfer	Free
Free unlisted or private number	Free

Source : EXPRESSO 2010

Internet Rates

Table 13: ADSL service rates

		ADSL 512	ADSL 1 mega residential	ADSL 1 mega Pro	ADSL 2 mega
Start-up costs	SONATEL access fees	11 500	11 500	11 500	11 500
	ORANGE access fees	7 500	13 500	13 500	13 500
	Total access fees without modem	19 500	25 000	25 000	25 000
	Modem	20 000	20 000	50 000	50 000
	Wifi Modem	50 000	50 000	50 000	50 000
Monthly charge	SONATEL access fees	12 500	17 000	17 000	17 000
	ORANGE access fees	5 500	8 000	10 000	14 400
	Total monthly charge	18 000	25 000	27 000	53 600

Source : ARTP 2008

Access fees have remained the same while monthly charges, particularly those of ADSL 512, experienced a decline of 7%, decreasing from 13,500 to 12,500 F CFA.

Data Links and Internet Leased Link Rates

According to the ARTP's 2008 report, the total number of data links (apart from interconnection links) reached 2,068 lines in 2008 (including analogue links, digital links, specialised Internet links and VPN). This number has decreased in 2008, due mainly to the decrease in number of analogue lines.

Rates remained stable over this period:

Speed	Service Access Fee	Monthly Charge
64 Kbits/s	531 000	308 241
128 Kbits/s		362 635
256 Kbit/s		402 929
512 Kbits/s		503 682
1024 kBits/s		952 871
2048 kBits/s		1 633 529
4096 kBits/s		3 103 706
8192 kBits/s		5 897 041

Analysis of Role Player Perception in the Telecommunications Sector Regulatory Framework

Depending on their category, the role players intervening in the telecommunications market are affected directly or indirectly by policies relating to the regulation. A survey on the perception of the regulatory framework was carried out in Senegal in 2009 on a sample of 45 role players who, directly or indirectly, intervene in the sector. The sample is sub-divided into role player categories:

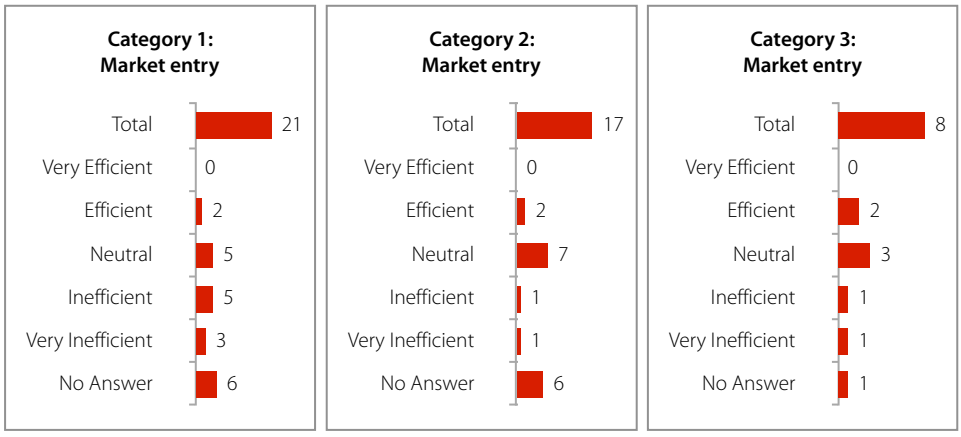
- **Category 1** corresponds to the role players who are directly affected by the regulations. It includes telecommunication operators, associations, manufacturers, equipment and ICT providers and investors;
- **Category 2** is made up of role players who hold a large interest in sector analysis. It includes financial institutions, equity analyst researchers, listing agencies, telecommunication consultants and law firms;
- **Category 3** consists of role players who have a particular interest in the improvement of the sector in order to help the public. It includes researchers, academics, journalists, civil society and consumer associations. Members of government administration and regulation agencies are not included in this group.

A sample of 45 role players, split according to the three categories (15 role players per category), was put together. A questionnaire was drawn up, keeping in mind the three segments of telecommunications services (fixed telephone, portable telephone and broadband Internet sectors). For each segment, the same questions were asked on market access, access to rare resources, interconnection, price regulation, anti-competition practices, the universal service obligation and service quality. The questionnaires were distributed online to the target sample in order to gauge perception of the regulatory framework of the telecommunications sector in Senegal. The results of this survey are reported in the form of the graphs below.

Fixed Line Telephone Segment

Market Entry

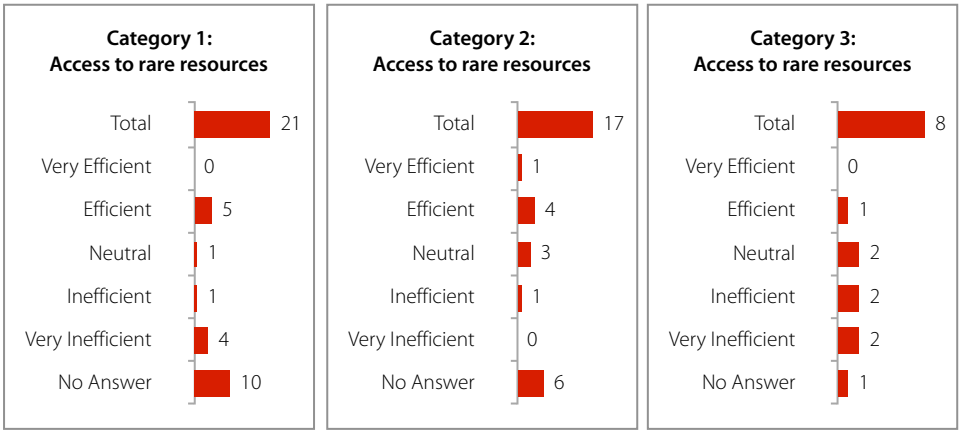
As far as entry to the telecommunications market is concerned, none of the 46 companies and role players who made up the sample rated the regulation of the sector satisfactory. Only role players from category 2 have a more neutral perception ("more or less efficient") concerning market entry. It should be noted that out of 46 role players, there were 33 respondents.



Source : CRES, TRE survey Senegal

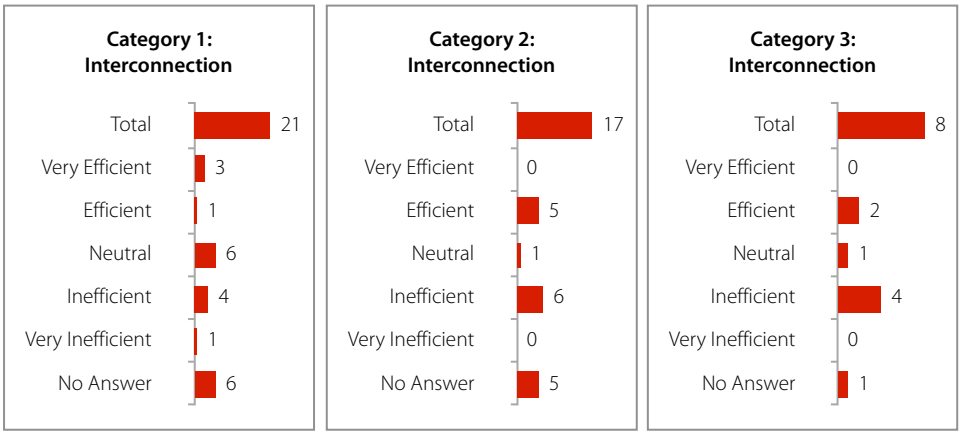
Access to Rare Resources

According to the first two categories of role players (1 and 2), access to rare resources is efficient.



Interconnection

The majority of people questioned from category 1 are neutral relating to their assessment of interconnection. On the other hand, those in categories 2 and 3 think that the interconnection policies are inefficient.

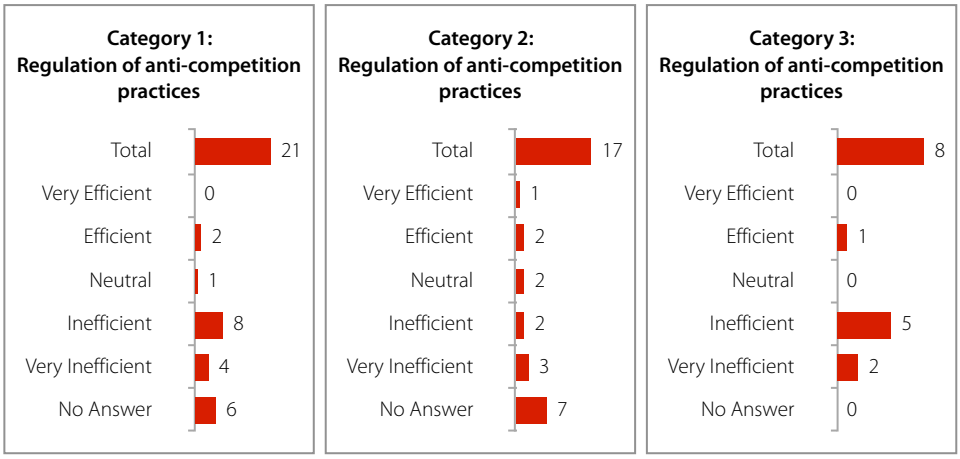


Price Regulation

The perception on price regulation is the same for all three categories of role players. The majority of them find that this regulation is inefficient (7/13 role players from category 1 who responded to the question, 5/12 role players from category 2 and 3/8 role players from category 3).

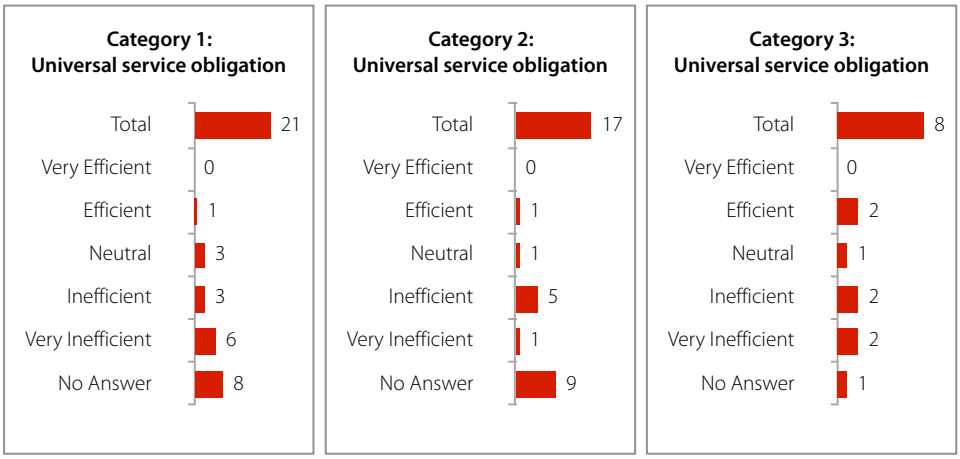
Regulation of Anti-Competition Practices

Globally, the regulation of anti-competition practices is perceived as being inefficient and even very inefficient (7/13 for category 1; 5/12 for category 2; 3/8 for category 3).



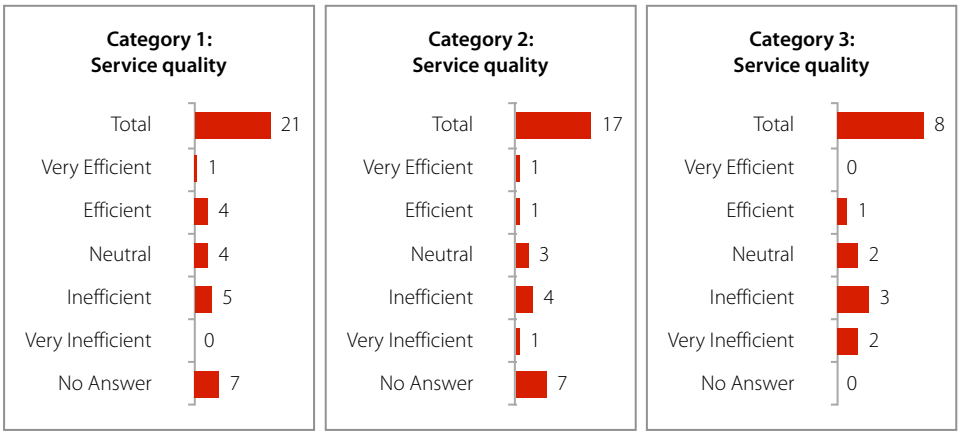
Universal Service Obligation

All the role players perceive this policy as inefficient for fixed-line telephones since access to this communication technology is not universal.



Service Quality

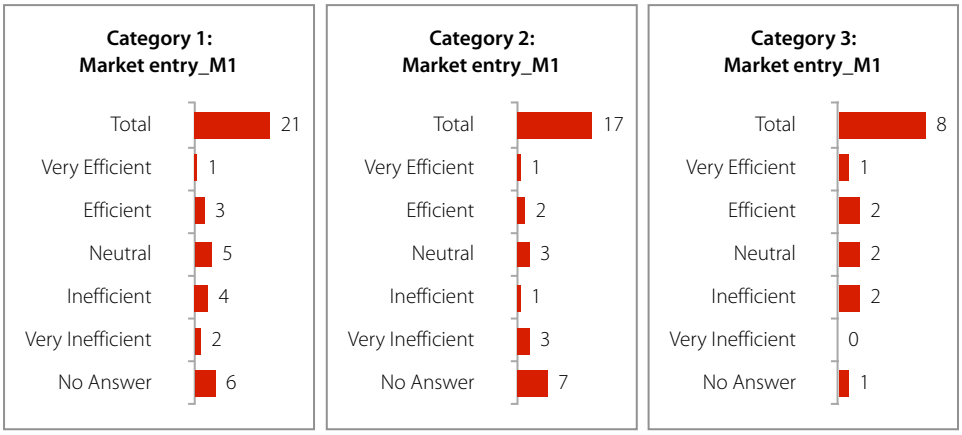
According to the panel questioned, service quality offered for fixed lines is not good. The role players from category 1 are a bit more indulgent with their assessment, which can, without a doubt, be explained by the fact that this category of role players consists of the main telecommunication service providing operators.



Mobile Telephone Segment

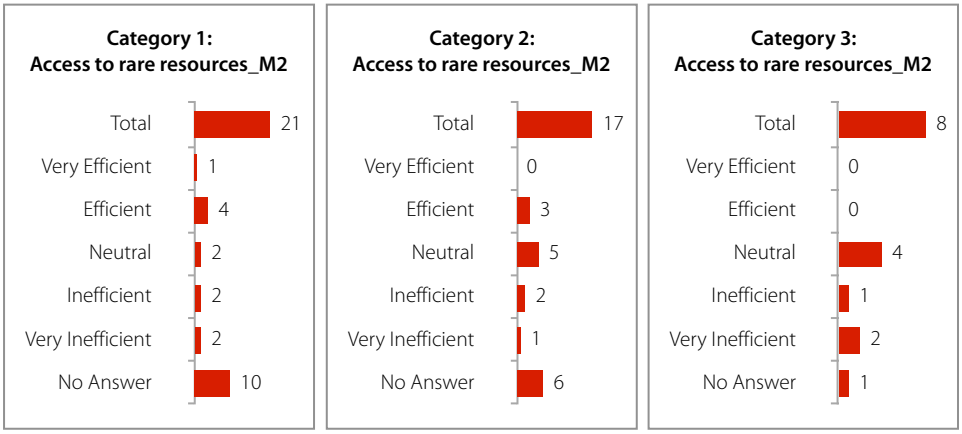
Market Entry

Practically all the role players maintain that mobile market entry is "more or less efficient" (the neutral position seems to be the most dominant for all categories of role players).



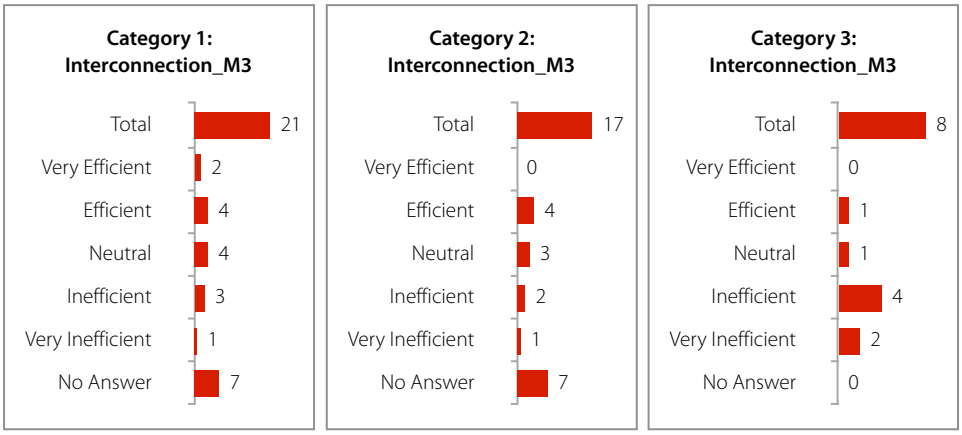
Access to Rare Resources

According to the role players in category 1, access to rare resources is efficient, while those in categories 2 and 3 adopt a neutral position.



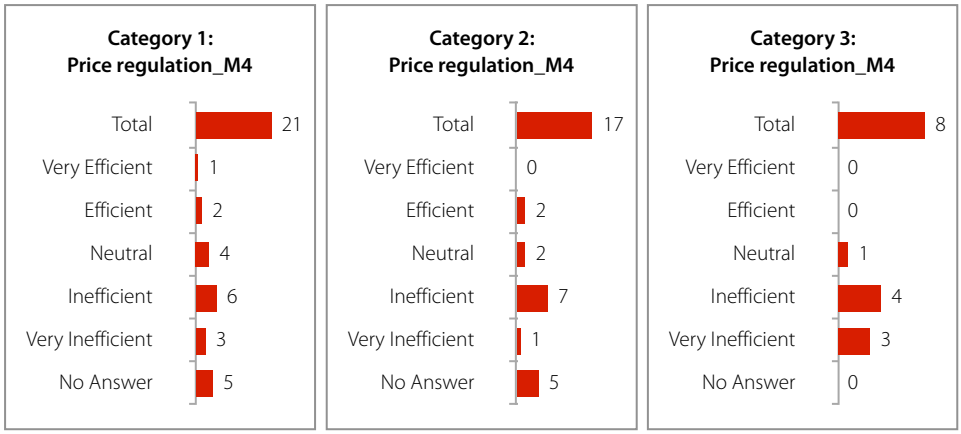
Interconnection

Those in categories 1 and 2 reckon that the interconnection policies between mobiles are efficient, while those in category 3 indicate the contrary.



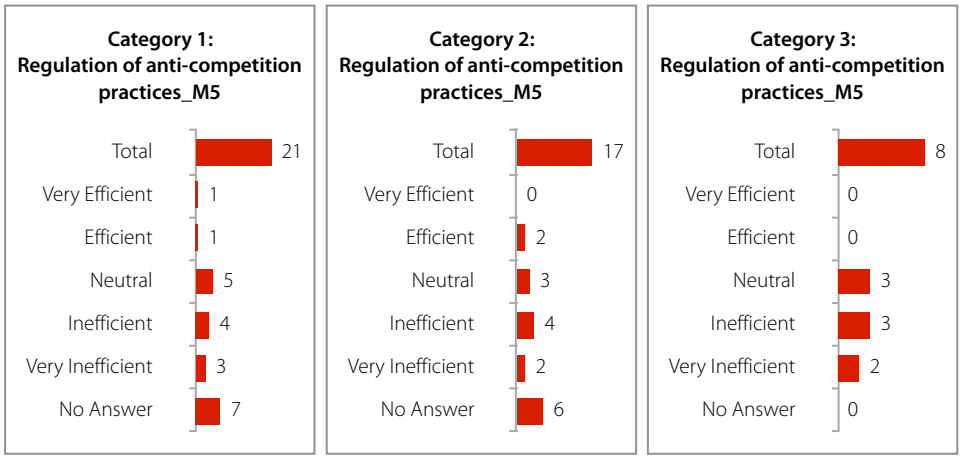
Price Regulation

The regulation of mobile communication prices is inefficient according to all the role players in all three categories.



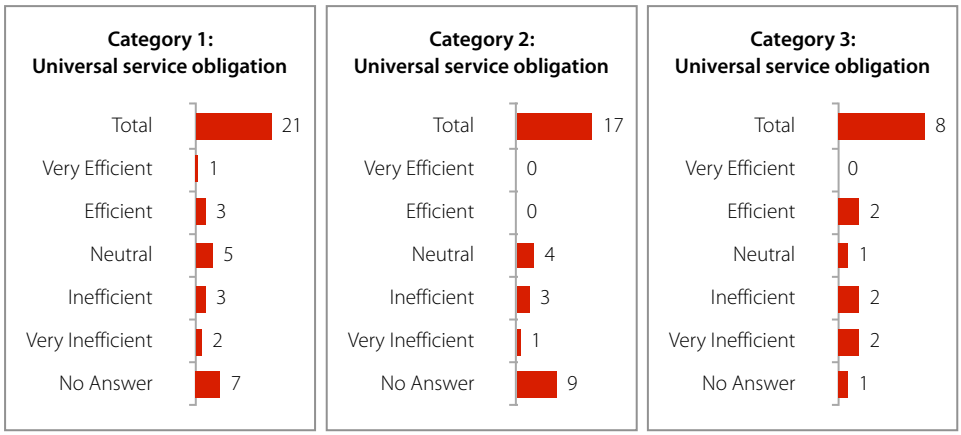
Regulation of Anti-Competition Practices

The majority of role players in all three categories take a neutral position relating to the regulation of anti-competition practices.



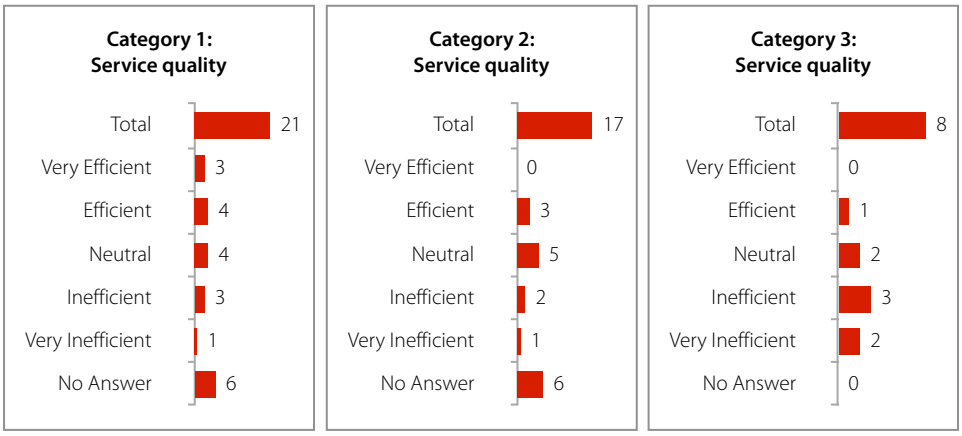
Universal Service Obligation

Globally, the mobile universal service obligation is perceived as more or less efficient by the role players in categories 1 and 2, and inefficient or even very inefficient by those in category 3.



Service Quality

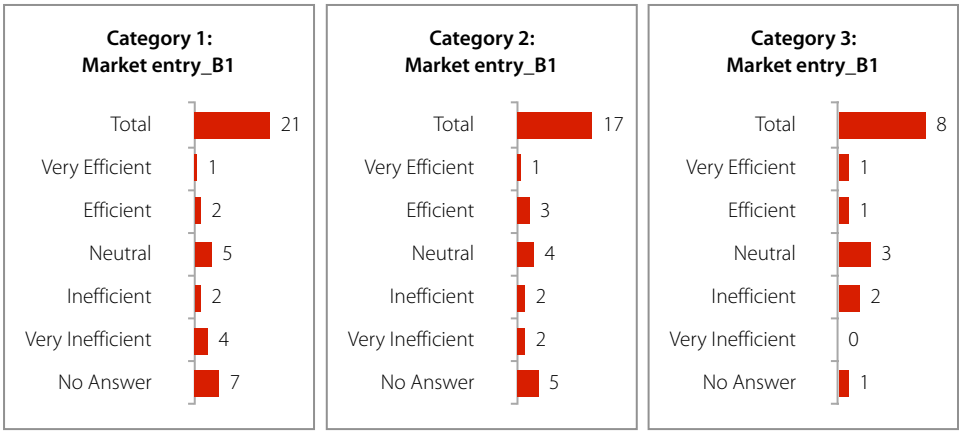
The assessment of mobile service quality varies relatively for role players from category 1. Role players from category 2 adopt a predominantly neutral position and those in category 3 say that service quality is bad.



Broadband Internet Segment

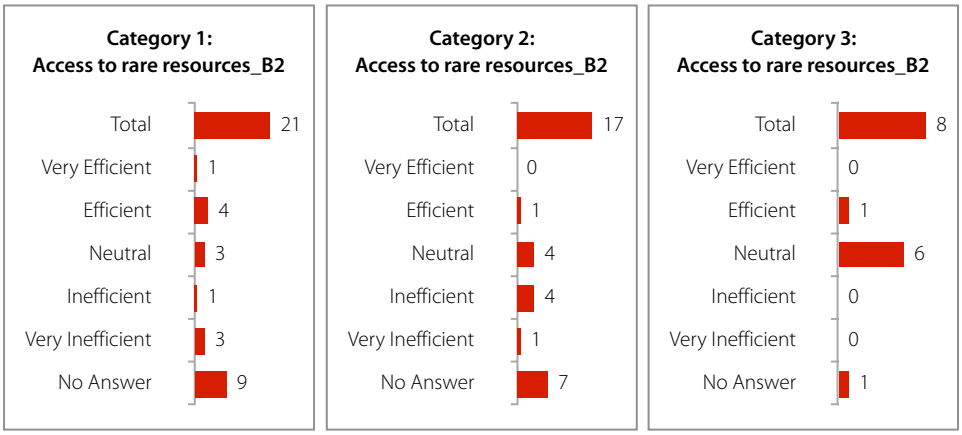
Market Entry

The majority of role players find broadband Internet market entry more or less efficient.



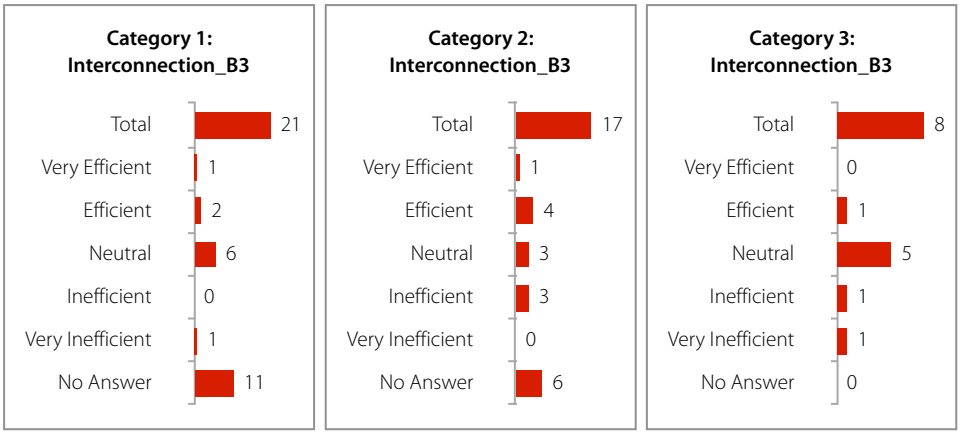
Access to Rare Resources

For role players from category 1, access to rare resources in broadband is efficient, while role players in other categories say that this access is more or less efficient (neutral).



Interconnection

Role players from categories 1 and 3 find that interconnection is more or less efficient (neutral), while the majority of those in category 2 find it efficient.

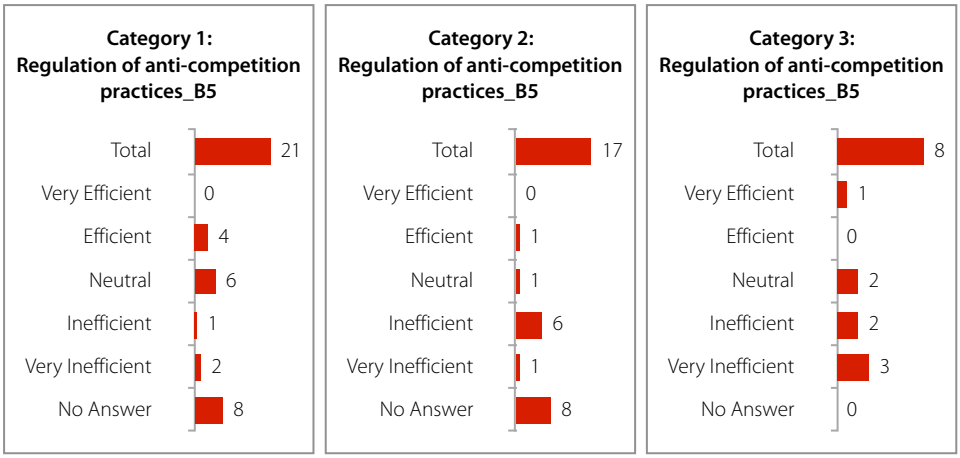


Price Regulation

Price regulation is inefficient according to all role players in all three categories.

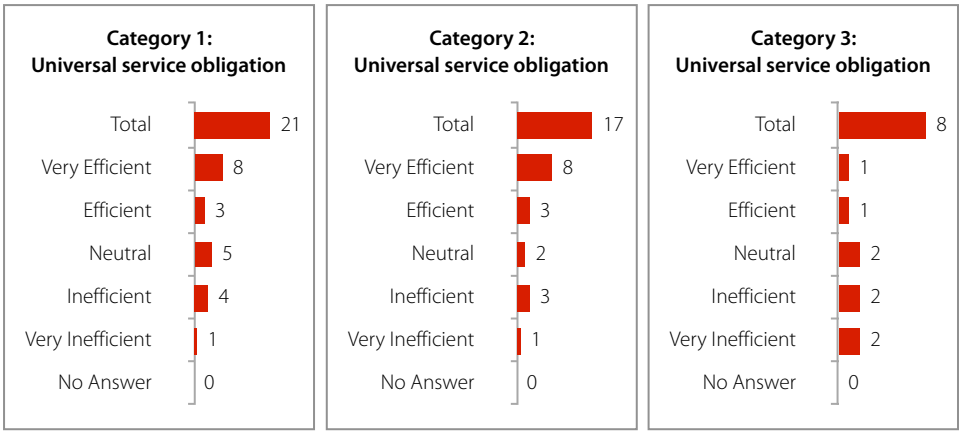
Regulation of Anti-Competition Practices

As far as the regulation of anti-competition practices is concerned, assessments differ. Role players from category 1 are neutral in relation to this regulation, while those in categories 2 think it is inefficient and those in 3 think that it is very inefficient.



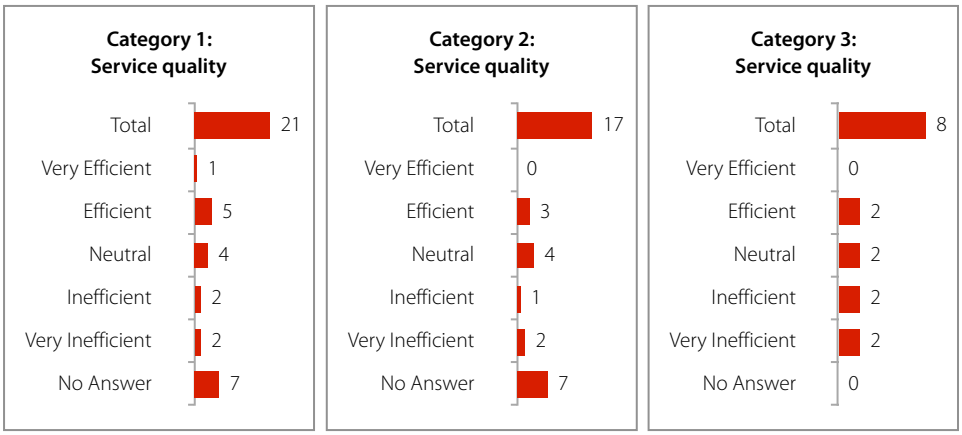
Universal Service Obligation

The companies from categories 1 and 3 indicate that service obligation is very efficient (8/21 for category 1 and 8/17 for category 2).



Service Quality

Service quality is efficient according to the majority of companies in category 1 (5/14 companies who actually responded to this question). The companies in category 2 have taken a neutral position in relation to the efficiency of service quality.



Weight of the ICT Sector in the Senegalese Economy

This is why telecommunications have become one of the most dynamic sectors in the Senegalese economy in the past decade, with a contribution of close to 7.1% to gross domestic product (GDP) at the end of 2004.

Senegal has made the ICT sector a priority in its economic and social development strategies. For the state, ICT constitutes one of the clusters that is meant to accelerate growth and reduce poverty by 2015. This is why telecommunications have become one of the most dynamic sectors in the Senegalese economy in the past decade, with a contribution of close to 7% to gross domestic product (GDP) at the end of 2004. This dynamism places telecommunications in the lead in the tertiary sector in particular, thanks to the large (0,8% rise in share of GDP growth) contribution of mobile telephones (ANSD 2008).

Investment in the Telecommunications Sector

In 2007, telecommunications operators made investments of close to 24 thousand million F CFA for fixed lines and 75 thousand million in the mobile telephone sector. These investments have been devoted to the improvement of fixed and mobile network coverage, and of service quality and innovation, as well as to the purchase of equipment goods (ARTP 2006). The telecommunications sector is one,which provides employment and create wealth.

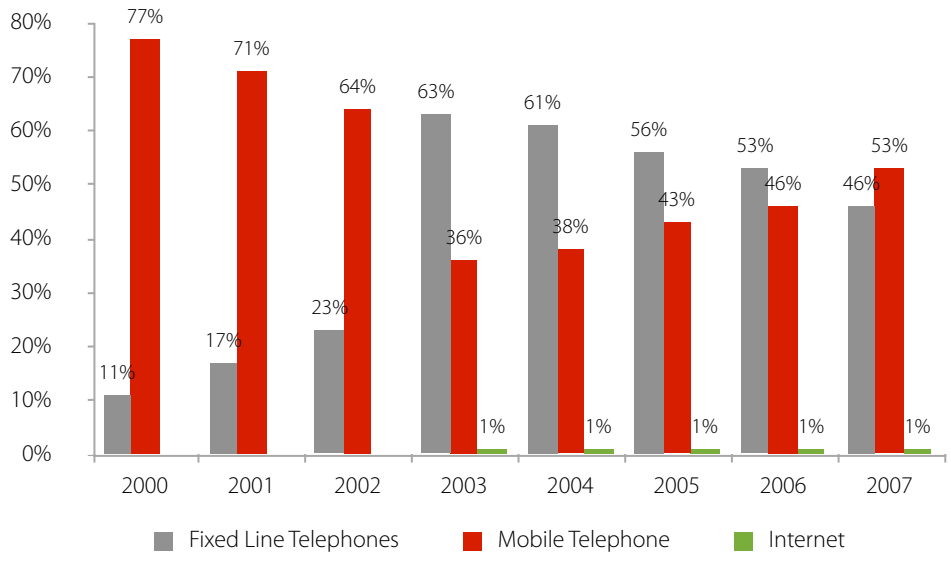
Employment in Telecommunications

The telecommunications sector contributes considerably to job creation in Senegal. On 31 December 2007, close to 2,100 jobs were listed from only the main operators (1,683 salaried workers at the fixed operator and 415 at mobile operators). In addition to the jobs created by the operators, there are close to 30,000 jobs generated by telecentres and internet cafés, as well as other jobs brought about through the use of value added services and teleservices.

Creation of Revenue by Telecommunications

As indicated in graph 6, mobile telecommunication contributes the most to the creation of revenue in the telecommunications sector. However, this contribution has decreased between 2000 and 2003 from 77% to 36%. After mobile phones, fixed telephones contribute the most to the creation of the sector's revenue. The contribution of the Internet market is very marginal. Thus, mobile telephones form the most dynamic link of the telecommunication sector in Senegal with a contribution of 53% (and increasing) to the sector's turnover.

Figure 8: Evolution of the contribution to the creation of revenue of the Telecoms sector in Senegal by type of ICT period 2000–2007



Source: Authors' calculations from ARTP data

Table 14: Contribution from the telecoms sector to GDP growth

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Contribution of the ICT sector to GDP growth	4.2%	4.6%	4.9%	6%	7.1%	9.1%*	9.3%*	9.3%*	9.9%*

** Contribution of the transport, posts and telecommunications sector*
Source: Compilation from ANSD and ARTP sources

The Share of Telecommunications in External Exchanges

In 2007, the importation of goods and services linked to ICT represented 0.8% of total imports in Senegal, while the exportation of said goods and services increased to 6.35% of total exports.

Table 15: The share of telecommunications in international commerce

	2000	2001	2002	2003	2004	2005	2006	2007
Importation of ICT goods and services (thousand million francs CFA)	6,4	9,0	15,8	11,6	14,5	19,8	19,5	19,8
Exportation of ICT good and services (thousand million francs CFA)				45,6	49,3	55,2	73,8	79,8
Total importations	1141	1161	1201	1544,2	1687,3	1948,4	2109	2337,6
Total exportations	866	879	911	1061,3	1151,5	1240	1254	1255,8

Source: ANSD – Authors' analysis and calculations

Contribution of Telecommunications in State Tax Receipts

The telecommunications sector contributes significantly and increasingly to tax receipts. In 2007, the State recuperated 53,497 thousand million francs CFA in tax receipts from telecommunication operators (ANSD 2008).

Table 16: Contribution of ICT to Senegalese State tax receipts

	2000	2001	2002	2003	2004
Taxes on Posts and telecommunications (in thousand million F CFA)	21.64	32.24	38.25	43.35	53.69

Source : ANSD

Universal Service of Telecommunications

The universal service of telecommunications is a task of the telecommunications and posts regulation agency (ARTP). By carrying it out, the agency aims to reach the objectives of the World Summit of the Information Society (WSIS) by 2015.

Public access to ICT services, as expressed in the telecommunications sector policy, remains a concern of the Senegalese government. The objective of universal service is to make access to telecommunication services available to the disadvantaged population.

In order to reach this objective, the State of Senegal adopted a universal service strategy, which has three central points.

In order to reach this objective, the State of Senegal adopted a universal service strategy, which has three central points:

- assuring telecommunication service provision in rural areas;
- developing telecommunication service access in urban areas; and
- implementing a fund for the development of the universal service of telecommunications.

The implementation of this strategy is justified by the fact that access to telecommunication services by the population in the rural world is limited. In fact, public telephone access points are available in only 1,000 villages out of the 14,206 in Senegal. There is, thus, no telephone network in more than 50% of villages.

Senegal has implemented mechanisms for this strategy, namely;

- rural public access, with development licences financed by the Universal Service Development Fund, and
- development projects financed by the Universal Service Development Fund.

Conclusion

The telecommunications sector in Senegal is doing well, notably in terms of opening up the market. The market has, in fact, been liberalised since 2004 with the entry of TIGO, SONATEL Mobiles' main competitor, and later by the operator Expresso, which holds a general licence.

The telecommunications sector in Senegal is doing well, notably in terms of opening up the market.

However, it has to be noted that the contribution of the sector to the economic growth of the country is weakened by the lack of global strategy.

In addition, for many role players, the liberalisation of the ICT sector has not been a participative process. For example, the other sectors of society have not been consulted in the framework of the privatisation of the incumbent telephone operator, who was, after all, one of the flagships of the Senegalese economy.

Certain State divisions, which are responsible for the ICT sector policy, provide efforts in implementing an operational legal framework, but the administrative complexities significantly delay texts coming from the National Assembly and the Senate. After the National Assembly and the Senate, a whole series of implementing decrees accompany these texts, often constituting an obstacle to their implementation.

However, it has to be noted that the contribution of the sector to the economic growth of the country is weakened by the lack of global strategy.

Recommendations

- Inform the role players of the existing ICT regulatory framework internationally and locally, and of the stakes of such a framework for their business;
- Involve a large range of role players (syndicates, civil society, the private sector, consumer rights protection associations, ecological organisations etc.) in the negotiations based on said framework, or at least gather their opinions;
- Proceed to the evaluation of the national ICT regulatory framework with the above-mentioned role players in order to take the rapid evolutions in the sector into account;
- Make the Regulator more independent in the process of granting licences and of the regulation of the telecoms sector;
- Remove the incoherence in the tasks of the regulator, which currently identify its telecommunication and ICT regulation tasks;
- Remove the overlapping of tasks between the regulator, the ADIE and the Ministry in charge of ICT and telecoms;
- Include the environment sector in the Regulator's prerogatives;
- The question of mobile penetration seems to be over-evaluated because of the inaccurate measurement of statistics on the active chips held by users. In fact, it is hard to accurately say how many active chips are held per person as the statistics produced by national regulatory organs as well as the ITU do not allow it;
- The ARTP operator has to see to it that operators identify active chip holders and carry out the destruction of inactive chips to better understand mobile penetration;
- The study could not bring out the real share of ICT in the GDP due to a lack of detailed data on the sector. To remove this limitation, it is essential to create "satellite ICT and telecommunication accounts" at the national accounting level. The opportune time for the projects of creating ICT watchdogs for the ANSD and the ARTP has come and could compensate for that.

In addition, for many role players, the liberalisation of the ICT sector has not been a participative process.

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Appendices

Table A1: Traffic from fixed-line communication 2008

Local	29%
National	13%
International	8%
Internet	4%
Mobiles	46%

Table A2: Fixed-line access fees

Urban connection	23400
Rural connection	117599
Residential deposit	16500
Business deposit	44000
Residential subscription	2415
Professional subscription	3135

Table A3: Rates in F CFA per minute for national communication

	Peak Hours	Off-Peak Hours
National	59	118
Local	15	30

Table A4: Credit transfer rates

Credit Transfer	
Price per transfer	0 F
Minimum amount of transfer	100 F
Maximum amount of transfer	10 000 F
Max. number of transfers/day/customer	10

Table A5: Expresso Prepaid Rate

Expresso Prepaid Rate	
	Price per second incl taxes
To Expresso	1,5 Fcfa
To other mobiles and fixed lines	1,5 Fcfa
Internationally	3 Fcfa
SMS to Expresso	25 Fcfa
SMA to other mobiles	25 Fcfa
SMA internationally	75 Fcfa

Source: Expresso 2009

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